HUMAN RADIATION EXPERIMENTS

RECORDS PROVENANCE FORM

REPOSITORY NAME	INEL
COLLECTION NAME	SYSTEM FOR NUCLEAR AUXILIARY POWER TRANSIENT (SNAPTRAN)
BOX NUMBER	INEL BOX NO. P-24724 FRC NO. 356723 ACCESSION NO. 70 A 1464
ADDITIONAL LOCATION INFORMATION	THE BOX IS STORED AT THE FEDERAL RECORDS CENTER IN SEATTLE, WA. INEL RECORD STORAGE RECEIPT NUMBER IS P-2133
FILE TITLE	TAN-SPERT HEALTH PHYSICS PROGRESS REPORT FOR JANUARY 1966, CORD-15-66A
TOTAL PAGES	
BATE NUMBER RANGE	
DOCUMENT NUMBER RANGE	

HEI FORM DOCUMENT NO.: T070035
DOCUMENT NO.: T070234
DOCUMENT TITLE: TAN-SPERT HEALTH PHYSICS PROGRESS REPORT FOR JANUARY 1966, CORD-15-66A
CROSS REFERENCES:
ITEMS OF INTEREST:

DOE/HRE-ID-C74

DOE READING ROOM
DOCUMENT TO BE RELEASED

T070234

1. Location of Reading Room: Idaho Operations Public Reading Room, 1776 Science Center Dr. University Place, Idaho Falls, ID 83403	2. Expected Release Date: May 15, 1995

3. Document Type:

[X] Letter
[ ] Memorandum
[ ] Report
[ ] Publication
[ ] Other (Specify)

a. If letter or memo:
To: J. W. McCaslin
From: O. L. Cordes
Subject: TAN-SPERT HEALTH PHYSICS REPORT FOR JANUARY 1966 CORD-15-66A

b. If report:
Title:

4. Document Date:

February 18, 1966

c. If publication:
Name:
Volume:
Issue:

5. Summary (2-3 lines indicating the major subject(s) of the document): Health Physics activities at the following facilities/operational areas: TSF, SPERT, SNAPTRAN, STEP, and DECON. Specific report on SNAPTRAN-2 reactor destructive test, Jan. 11, 1966 and fuel loading of SPERT III to critical, Jan 12, 1966.

6. Name and telephone number of person completing form:	7. Organization:	8. Date:
Burton R. Baldwin (208) 525-0203	Lockheed Idaho Technologies Co.	March 22, 1995

[ ] Check here if a copy of the document is being sent to Headquarters.

~~JWMc~~ 2/25

PHILLIPS PETROLEUM COMPANY
Atomic Energy Division
Idaho Falls, Idaho

February 18, 1966

TAN-SPERT Health Physics Progress Report for January 1966
Cord-15-66A

Mr. J. W. McCaslin
O F F I C E

The monthly report of the TAN-SPERT Health Physics Section for January 1966 is as follows.

TSF

The major activities requiring HP coverage in the TSF area during Janaury were:

1. Hot Shop hot waste shipments
2. Monitoring entries into the HCA cells
3. Surveillance during transfer of radioactive material in the pool area
4. Hot Shop PM-2A monitoring
5. Evaporator basement hot pump removal
6. RML manipulator repairs
7. Surveillance during X-ray analysis of PM-2A
8. Surveillance during decontamination of EG&G dolly.

The RML was shutdown for repairs and during this period contamination to 7,000 c/m occurred in the RML control room during the removal of the maniuplators. The area was successfully decontaminated after 3 moppings. After the in-cell filters were removed and a remote washing completed, the general radiation field inside the RML was 1000 mr/hr. The cell was entered and subsequent washing has reduced general fields to 700 mr/hr. The cell shutdown continues with equipment being removed for decontamination and repairs.

A large cask assigned to SPERT was checked for voids using 5 canned fuel specimens, from the Hot Shop, which read 1000 R/hr at one foot. No voids were detected.

Assistance was given to STEP personnel during and after the SNAPTRAN-2 destructive test. Sampling equipment for grid monitoring was prepared, positioned, and recovered after the test. Post test monitoring of the locomotive and EG&G camera dolly along with assistance in the IET area clean-up was also provided.

Decontamination Facilities

The major items decontaminated, chemically cleaned, or sandblasted during January include:

1. 6 casks
2. SPERT fuel rods
3. EBOR fuel oil pre-heaters
4. ML1 Reactor support fixtures

5. PBF inpile capsules
6. Pump and equipment from Evaporator Building
7. Hot Shop manipulator parts
8. PM-2A test skid equipment.

SPERT

During critical loading of the SPERT III reactor, Health Physics personnel performed routine functions of clearing the area during each test of criticality approach. Fuel handling during this period required constant HP surveillance. A critical loading was attained on January 12, 1966, and successive fuel loadings brought the core to an operational status. As operation of this facility continues, Health Physics surveillance will be required.

Several nuclear operational tests were accomplished during the month as part of the SPERT IV "CDC Capsule Test Series."

Air activity followed nuclear operation involving transients. The intensity of airborne contamination appeared to increase with each successive test as the inventory on the fuel increased and the msec period of the tests decreased. When tests were conducted late in the afternoon, re-entry was delayed until the following morning when decay of the activity permitted entry without respiratory aids. Concentration of the airborne activity reached a maximum of about 10 air activity units (aau) equivalent to 10^{-8} μc/cc.

Close surveillance of capsule opening for examination and photographing and subsequent packaging and shipment to TAN Hot Shop for decontamination was practiced by Health Physics at the reactor building.

SNAPTRAN

The SNAPTRAN-2 reactor destructive test was successfully initiated at 0951 on January 11, 1966. Instrumentation response indicated the test was a success, and observation of the test pad by closed circuit television showed the reactor was completely disassembled.

Approximately three minutes following the test, radioactive air activity was detected on the CAMs located near the control room and service areas in the underground IET complex. The rapid rise in air activity made it necessary to evacuate personnel from the IET control area through the vehicle tunnel. A limited number of personnel wearing respiratory equipment remained behind to complete the processing of initial data before leaving the area.

All personnel that evacuated the IET area were screened through the TAN 607 area and checked for contamination. The majority of the 64 personnel surveyed showed no significant contamination; however, the clothing of a limited number of people had a maximum reading of 4 mr/hr. All items that were confiscated were returned within 24 hours.

A number of people that were in the IET area during the test were given whole body counts and only background activity was reported. The film badges for all personnel participating in the test were read and no exposure was reported for anyone who had been in the control area during the evacuation.

Gamma spectroscopy of charcoal filters from the IET CAMs and breathing apparatus showed no iodine. This was a surprise as iodine was detected on filters sampling outside the underground control room. It was determined that the gases, including iodine, entered the control area by following instrument leads into the coupling station, hence along cable trays into populated areas. The coupling station is sealed off from the control area by three partitions with closed doors. The penetrations through these partitions are minimized to narrow openings for the instrument leads. Following re-entry, smears were taken on exposed surfaces in the coupling station and along the cable trays. Subsequent gamma ray analysis of these smears indicated the bulk of the activity was tellurium and iodine. The tellurium and iodine, while making its tortuous path to occupied areas, was removed by plating out on the many available surfaces.

Because of the evacuation delay, the first re-entry team entered the reactor area approximately two hours following the test. Direct radiation levels encountered were as follows: 300 mr/hr at 50 meters, 3.5 r/hr at 25 meters, and 25 r/hr at 10 meters. Reactor parts such as the upper grid plate, support fixtures, control drums, beryllium, and fuel fragments were scattered about the test pad area.

On January 12, a detailed contamination and radiation survey was made of the test area. This survey indicated that a heavy concentration of small fuel fragments were scattered out to the 25 meter arc and the general radiation field at 25 meters was 100 mr/hr.

On January 13, decontamination teams were organized to clean the test area. By January 20, the area outside the security fence was cleared of all detectable fuel particles. Inside the security fence fuel was removed from the area from the IET guard gate to the IET east entrance, including the parking lot and the road leading to the mobot garage. The clearing of debris from the reactor pad, dolly, and test cell continues.

Analytical work continues on the hundreds of samples generated during the test, but information that has been assembled indicates that the radiological consequences of the destructive test were more severe than those experienced in the SNAPTRAN-3 water immersion test. At the time of the SNAPTRAN destructive excursion, radiation monitoring equipment 75 feet from the reactor recorded dose rates up to 800 r/hr. The dose rate at this location had decayed to 30r/hr within 20 minutes after the test.

Integrated exposures, monitored by film badges, gave a maximum gamma dose of 600 rem 30 feet from the reactor. This exposure is due to the prompt gammas from the excursion, exposure to the radioactive cloud, and a two-hour exposure to the remaining decay products dispersed in the area. The six hour accumulative upwind gamma exposure reads as follows:

Distance (feet)	rem
160	34
330	4
660	0.7
980	0.2

The maximum recorded dose at a point 5000 feet downwind was 30 mrem and was a result of the cloud passing overhead along with direct radiation from the reactor site.

The radioactive gases released from the fuel formed a cloud which was carried by an 11 mph wind over a monitoring grid. High volume air samplers, particle sizers, fallout plates, and film badges monitored the cloud as it meandered northeast. Data from these sources are still being analyzed but it can be concluded that noble gases and their daughters, along with the isotopes of tellurium and iodine, were the major radioactive constitutents of the cloud.

Special Problems

The linear velocity profile in the TAN 607 main stack was measured to insure the data used for calculating stack release activity was correct. The measurements were made 35 feet up on the stack where the sampling probe enters the stack. This point of entry is about 10 feet downstream from the nearest exhaust duct entry. Ideally, the point of sampling should be located farther downstream; however, the duct in question contributes only a small amount of turbulence since its flow rate is only 2% of the total stack flow rate.

An inclined manometer, thermometer, and a pitot tube positioned at predetermined points, representing equal areas on the stack diameter, were used to determine the average linear stack velocity. Combining this average velocity and the stack cross section area yields a flow rate of 44,200 ft^3/min. This is in good agreement with a rate of 44,300 ft^3/min which has been used in calculating stack activity releases.

The linear velocity of the sample entering the permanent sampling probe, which is 3/8 inch in diameter and located 15 inches in on the stack diameter of 44 inches, has been adjusted to correspond with the linear velocity in the stack of 3900 ft/min at this point. The stack monitor will be permanently set to pull 2.5 ft^3/min. The sampling probe nozzle is not beveled. However, from referring to AIHA Conference Trip Report, RGA-46-63A, an unbeveled nozzle causes only a 10 percent increase in sample volume. This is certainly within the degree of accuracy of the other phases of the monitoring and final release calculations.

A work order has been submitted to maintenance, with a requested completion date of March 1, 1966, to remove all sharp 90^o bends in the sample line which leads to the stack monitor.

General

The impending contract change and segmentation of responsibilities raises several problems which should be considered. One of the more important problems occur with the health physics instrumentation at TAN. As it now stands most of the equipment we use is assigned to D. G. Reid as custodian. Some is assigned to R. Heath, and still others assigned to R. B. Johns. Additionally, some of the equipment we expect to use on the LOFT project is also assigned to D. G. Reid. It seems prudent that this equipment should be divided and reassigned to the proper custodians within the near future. In line with this we are actively preparing a list of those items which should be transferred to the TAN-SPERT Health Physics section and the Engineering and Test Branch. Some items will no doubt require management arbitration.

A second area that should be considered is the shifting of the HP responsibility for the TSF area from the TAN-SPERT HP Section.

The remaining TSF HP group will have to function on its own, and its facilities should be upgraded for this task. One of the major items required will be office space for the TSF HP foreman where he can perform such functions as preparing the radiological waste reports, making up decontamination schedules and keeping abreast of current literature. The present wide-open field office is inadequate for this type of work. Adequate counting room facilities is the second major item required. The current counting area is a screened in room next to a large open driveway in the 607 building. Across the driveway a number of different activities occur--from welding to sandblasting. The dust, noise, and temperature fluctuations are deterimental to the operation of adequate counting facilities in this area. Since these instruments will not be backed-up by those in TAN 606 following the contract split, a greater reliance will have to be placed on them and more adequate housing should be provided.

Both the adequate office space and the adequate counting instrument space could be obtained by enclosing the entire area used by the TSF HP field office with solid walls and ceiling.

Summary of Routine Work

Smears	4640
Direct reading dosimeters	46
Body fluid sampled	
Routine	90
Special	1
Liquid samples	
Waste water	4
Radioactive Shipments	
Off-site	3
On-site	83
Burial Ground	7
Laundry	10
Safe Work Permits	58
Beryllium analysis	1
Safety Meetins	2
Excess exposure request	2
Whole body analysis	10
Green tags	264

To: J. W. McCaslin
File: Cord-15-66A
February 18, 1966
Page 6

MAN HOUR TABULATION

EXEMPT	NONEXEMPT	TOTAL	EXEMPT	NONEXEMPT	TOTAL
	Scheduled Hours			Actual Hours Worked	
1336	1656	2992	1395.5	1641	3036.5
	Overtime			Absences	
69	153	222	S - 1.5	152	153.5
			SF - 8	8	16
			V 0	8	8
			H 0	0	0
			DF 0	0	0
	TOTAL	3214		TOTAL	3214

OLCordes:dcm

O L Cordes

cc: J. P. Lyon
M. H. Bartz
W. N. Nyer
R. G. Anderson
F. L. Bentzen
J. R. Fielding
E. L. Goven
O. M. Hauge
R. E. Hayden
R. K. Ingram
D. K. Jenson
R. B. Johns
L. J. Johnson
E. A. King
B. C. Laney
D. R. Mousseau
R. S. Peterson
N. G. Reece
D. G. Reid
P. E. Ruhter
B. F. Savignac
F. Schroeder
A. L. Smith
J. F. Sommers
L. P. Terch
D. R. Wenzel
T. R. Wilson
TAN-SPERT HPs
O. L. Cordes
File